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A Tracking Study of 1977 Medical Graduates Through Graduate Medical Education in Ontario

A. I. Rothman, Ed.D.

Abstract—In this paper, the author describes the results of tracking a cohort of medical school graduates through the graduate medical education system of Ontario, Canada. The cohort consisted of the 1977 graduates of the five Ontario medical schools who entered the graduate system at some point between 1977 and 1982 and graduate trainees who had graduated in 1977 from medical schools outside Ontario. The objectives of the study were to determine what proportion of the total number of 1977 Ontario medical graduates received graduate training in Ontario; to document the flow of the trainees into and out of the Ontario graduate system; and to compare the graduate training patterns of the Ontario graduates in the cohort with the trainees from elsewhere.

Physician manpower planning has been one response to the growing problem of providing high quality health services at levels of financial costs acceptable to society. Activity in this area at the national level has occurred in both Canada (1, 2) and the United States (3–5). In Canada, where provinces bear the primary responsibilities for the delivery of health care and the education of medical professionals, the capacity to plan effectively has been sought by several of the provinces. At present this capacity is highly developed in Ontario (6) and has involved the Province of Ontario Ministry of Health and the Council of Ontario Faculties of Medicine. At all levels, planning has required accurate data describing the active physician complement and the output of medical schools and graduate training programs. In addition, there has been the need at the provincial level for data describing the rates of provincial medical manpower immigration and emigration.

In Ontario, data describing the output of the medical undergraduate programs of the five provincial medical schools (McMaster University, University of Ottawa, Queen's University, University of Toronto, and the University of Western Ontario) have been easy to obtain. In addition, an accurate registry of active medical manpower in Ontario is published annually by the Ontario Physician Manpower Data Centre in Toronto. The planning process, however, requires an understanding of the relationship between the production and the subsequent distribution of medical manpower in the province. Tracking studies of the output of the provincial undergraduate and graduate training programs are needed to help in reaching this understanding.

The work described here was funded by the Ontario Ministry of Health and was done with the assistance of the staff of the Ontario Physician Manpower Data Centre, Toronto.

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The purpose of the study reported here was to contribute to the process of medical manpower planning in Ontario by tracking a cohort of graduate trainees through the Ontario graduate system. The cohort consisted of graduate trainees in the Ontario system who were graduated from an undergraduate medical program either in Ontario or elsewhere in 1977.

The specific goals of this study were (*a*) to determine what proportion of the total number of 1977 Ontario medical graduates received graduate training in the Ontario system; (*b*) to document the flow of trainees in the cohort from Ontario or elsewhere into and out of the Ontario graduate system; and (*c*) to compare the graduate training patterns of the Ontario graduates with the trainees from elsewhere.

In this paper, the data generally are provided by broad categorizations, but more detailed representations were used in the report prepared for the Ontario Ministry of Health.

The Data

The data for this study were obtained from the postgraduate registry of the Ontario Physician Manpower Data Centre. The registry is derived from online computer systems that link the graduate offices of the five Ontario medical schools with the data centre. The centrally stored data are continually updated and reflect the current graduate registrations at each of the training centres. For the purposes of this study, graduate registration data were frozen at the end of June 1982 for all members of the cohort. The use of the data centre facilities and the data were approved by the data centre's management committee, which includes representatives of the Ontario Ministry of Health, the Council of Ontario Faculties of Medicine, and the College of Physicians and Surgeons of Ontario.

The Cohort

A total of 570 students were graduated from the five Ontario medical schools in the spring of 1977. Of these, 408 (72 percent) entered the Ontario graduate system at some point in their graduate training and constituted one part of the study cohort. The second part of the cohort consisted of 275 medical school graduates from elsewhere who also had graduated in 1977 and had entered the Ontario graduate system. In this group, 191 trainees were Canadian citizens or landed immigrants (immigrants with legal status in Canada and who intend to become Canadian citizens) who had received their M.D. degrees outside Ontario, and 84 were non-Canadians with employment visas or other kinds of visas.

Percentages rather than numbers of trainees are presented in the tables in this paper. In the tables relating to the Ontario graduates (tables 1 and 2), the percentages have been defined with reference to the total number of Ontario graduates in the cohort (408). In tables relating to the trainees from elsewhere, the percentages have been defined with reference to the number of non-Ontario trainees referred to in the respective tables (Table 3 describes all non-Ontario trainees in the cohort [275]; Table 4, the non-Ontario Canadians [191]; and Table 5, non-Canadian visa trainees [84]).

Results and Discussion

The data in Table 1 indicate the movement of Ontario graduates in the cohort into and out of the Ontario postgraduate system in the five-year interval July 1, 1977, to June 30, 1982. For example, in the 1978–79 academic year, 74 percent of the 408 Ontario graduates in the cohort were enrolled in the system, 4 percent were yet to enroll, 5 percent had left the system but would enroll again, and 17

TABLE 1

Percentage of 1977 Ontario Medical School Graduates (n = 408) in the Ontario Graduate System, 1977–78 to 1981–82

Postgraduate Year	Enrolled in System	Enrolled Later	Left But Re-enrolled Later	Left Permanently (Cumulative)*
1977–78	91	9	—	—
1978–79	74	4	5	17
1979–80	51	2	5	42
1980–81	44	1	2	53
1981–82	37	—	—	63

* For example, 17 percent left the system at the end of 1977–78, and 25 percent left the system at the end of 1978–79, giving a total of 42 percent who had left the system by the end of 1978–79 (or the beginning of 1979–80).

TABLE 2

Percentage of 1977 Ontario Medical School Graduates (n = 408) Enrolled in the Ontario Graduate System, by Program Area

Postgraduate Year	Straight Internship	Rotating/ Mixed Internship	Family Medicine	Surgery	Medicine	Other
1977–78	59	32	—	—	—	—
1978–79	—	—	25	10	17	22
1979–80	—	—	5	10	15	21
1980–81	—	—	1	11	11	21
1981–82	—	—	1	10	9	17

percent had left the system and would not return. Table 2 presents the distribution of the Ontario graduates in the system in two training categories in the internship year and in the years following within four broad training categories: family medicine; surgery, including the surgical subspecialties; internal medicine, including the medical subspecialties; and others, such as obstetrics/gynecology, psychiatry, pediatrics, otolaryngology. Tables 3, 4, and 5 describe in similar ways the flow and distributions within program categories of the non-Ontario trainees.

In the first two tables the progression of the 1977 Ontario medical school graduates through the graduate system can be traced. Twenty-two percent of the Ontario graduates left the system immediately after the internship year. Twenty-five percent participated in the two-year family practice program, and most of these trainees left at the end of the second graduate year. In the fifth year, 37 percent were still participating in specialty training in Ontario. At the end of the fifth year, 95 percent of these trainees had left the Ontario system (not shown in tables).

In contrast, the data in tables 3, 4, and 5 suggest that generally the non-Ontario trainees had training goals that were substantially different from those of their Ontario graduate colleagues. It appears that the non-Ontario trainees were more interested in advanced level training, since proportionately fewer selected training in family medicine. Differences between the enrollment patterns of the two parts of the cohort over the five-year interval of the study were one consequence of the different training goals. As time progressed, enrollment of the non-Ontario trainees in the graduate system increased while the enrollment of the Ontario graduates decreased.

The data in tables 4 and 5 indicate that there were significant differences between the training paths of the Canadian and

TABLE 3

Percentage of 1977 Non-Ontario Medical School Graduates (n = 275) in the Ontario Graduate System

Postgraduate Year	Enrolled in System	Enrolled Later	Left Permanently (Cumulative)*
1977–78	38	62	—
1978–79	42	46	12
1979–80	37	38	25
1980–81	49	21	30
1981–82	55	—	45

* For explanation, see footnote to Table 1.

TABLE 4

Percentage of 1977 Non-Ontario Medical School Graduates (n = 191) Who Were Canadians or Landed Immigrants in the Ontario Graduate System, by Program Area

Postgraduate Year	Enrolled Later	Enrolled						Left Permanently (Cumulative)*
		Straight Internship	Rotating/ Mixed Internship	Family Medicine	Surgery	Medicine	Other	
1977–78	52	21	27	—	—	—	—	—
1978–79	36	—	—	12	6	10	22	14
1979–80	29	—	—	5	5	7	24	30
1980–81	17	—	—	3	5	9	31	35
1981–82	—	—	—	2	7	8	35	48

* For explanation, see footnote to Table 1.

TABLE 5

Percentage of 1977 Non-Ontario Medical School Graduates with Visas (n = 84) in the Ontario Graduate System, by Program Area

Postgraduate Year	Enrolled Later	Enrolled						Left Permanently (Cumulative)*
		Straight Internship	Rotating/ Mixed Internship	Family Medicine	Surgery	Medicine	Other	
1977–78	85	13	2	—	—	—	—	—
1978–79	70	—	—	1	4	5	13	7
1979–80	58	—	—	—	4	8	16	14
1980–81	31	—	—	—	9	13	29	18
1981–82	—	—	—	1	18	8	34	39

* For explanation, see footnote to Table 1.

visa sections of the non-Ontario part of the cohort. For example, the non-Ontario Canadians tended to enter the Ontario system sooner and to leave sooner; and a significant proportion of these Canadian trainees (12 percent) participated in the family practice residency program.

On leaving the Ontario graduate system after one or two years of training, twice as many Ontario graduates stayed in Ontario as went elsewhere. This trend was less pronounced among trainees who departed in the next two years and, in fact, was reversed among those who left the graduate system after the fifth year. That is, Ontario graduates who left the system and stayed in Ontario tended to enter general or family practice. By contrast, this trend was modified and then reversed for Ontario graduates who left in subse-

quent years to enter specialty practice or to take further subspecialty training.

In the interval of the study reported here, a significant proportion (18 percent) of the non-Ontario Canadian trainees remained in the province on leaving the Ontario graduate system. It is probable that more than half of these trainees entered general or family practice.

Of the visa trainees who left the graduate system in the interval of this study, only a few (10 percent of this part of the cohort) remained in Ontario. A majority of the visa trainees (61 percent) were still in the graduate system at the end of the 1980–81 academic year.

Conclusions

In this study, a cohort of graduate trainees was tracked through the Ontario graduate medical education system. The cohort included the 408 graduates of the Ontario medical schools who had been graduated in the spring of 1977 and who had entered the Ontario graduate system at some point in the next five years, the term of this study. In addition, the cohort also included 275 trainees who had graduated from medical schools outside Ontario in the spring of 1977. In this group, 191 of the trainees were non-Ontario Canadians or landed immigrants, and 84 were non-Canadians holding visas.

A total of 570 students graduated from the medical schools of Ontario in the spring of 1977, and 408 of these students entered the Ontario graduate system at some point in the next five years. The results of this study indicated that there were relatively well-defined differences between the trainee groups in the cohort with reference to: the training programs followed, points of entry into the system, duration of training, points of exit, and the relative number of trainees staying or leaving Ontario at the completion of their training.

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DATAGRAM

Trends in Teaching Hospital Construction Funding, 1969–1981

Periodically since 1968, the Association of American Medical Colleges (AAMC) has published analyses of the sources of construction funding of the nonfederal members of its Council of Teaching Hospitals (COTH) and of all nonfederal, nonprofit hospitals nationwide. The data for these analyses were extrapolated from the American Hospital Association's (AHA) Survey on the Sources of Funding for Hospital Construction for the years 1969, 1974, and 1979. The current discussion will contrast the data from these previous years with selected results from the AHA survey for 1981. The survey is sent to all hospitals nationwide, and responses are received from hospitals that began construction projects in the survey year.

Table 1 and Figure 1 display the trends in total construction funding by source for COTH nonfederal members in each of the four survey years studied. Table 2 presents data on an average-per-institution basis. All of the 1969 amounts relate to total funds for construction projects completed that year. For 1974, 1979, and 1981, the data reflect total funds for construction projects started in those years. Table 3 shows the percentages of construction funds by source at both COTH nonfederal members and all nonfederal, nonprofit, short-term hospitals (including the COTH hospitals) in 1981. For the analysis, these hospitals are differentiated by ownership—state and local government versus nongovernment, voluntary nonprofit. Long-term, investor-owned, and federal hospitals are excluded from the data.

COTH Hospitals

As shown in Table 1, $284 million was expended on capital construction in 1969 by 126 COTH-member institutions. At that time, funding from hospital internal operations (that is, accumulated earnings) and state and local grants and appropriations provided 51 percent of the construction capital. In 1981, these combined sources provided only 21 percent of total construction funds at the 66 COTH respondents. As philanthropy and government grants for construction projects continued to wane, reliance on debt financing continued to rise. In 1969, only 20 percent of COTH-member construction funding was derived from some form of borrowing. This percentage grew dramatically to 50 percent in 1974, to 68 percent in 1979, and to a new high of 74 percent in 1981. Thus, nearly three-quarters, or $653.2 million, of total construction funds at COTH hospitals in 1981 was financed through debt. About 87 percent of this amount was acquired through the issuance of state and local tax-exempt bonds (that is, the interest is exempted from federal, state, and local income taxes), which have become the largest single source of construction funds at both COTH and other nonprofit hospitals nationwide. Twenty-five states now have state authorities to sell hospital tax-exempt bonds, and 34 states have legislation enabling other governmental units to issue such bonds.

A total of $879 million in funds for construction projects started in 1981 were reported by the 66 COTH institutions. When adjusted for inflation in construction costs, this figure is equivalent to $308 million in 1969 constant dollars. Because the COTH sample size differed substantially in the 1969 and 1981 survey years (126 versus 66 hospitals), comparisons were made based on the average inflation adjusted dollars expended per institution in these years, as well as 1974 and 1979. As shown in Table 2, the 1981 average ($4.67 million) was 107 percent higher than the 1969 average ($2.25 million) and 81 percent higher than in 1979 ($2.58 million). However, the 1974 inflation adjusted dollar average ($5.14 million) expended per COTH survey institution exceeded the 1981 figure by 10 percent.

Accompanying the tremendous rise in the use by COTH members of debt financing was

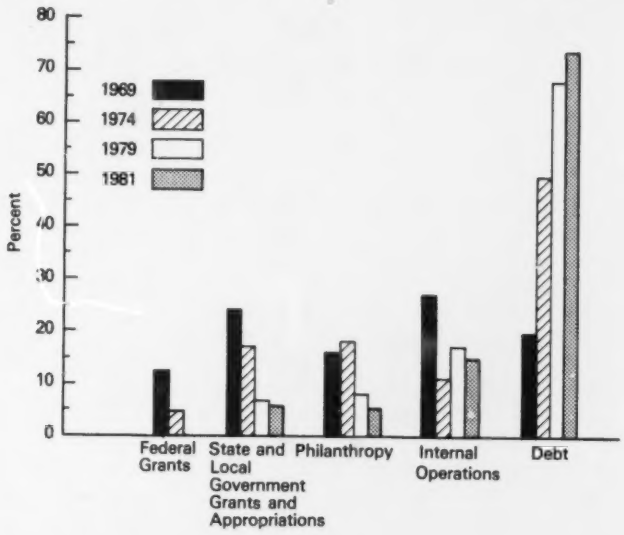

FIGURE 1

Sources of construction funds for COTH nonfederal hospitals, 1969, 1974, 1979, and 1981 (Source: American Hospital Association's Survey of the Sources of Funding for Hospital Construction, 1969, 1974, 1979, 1981).

a steady decline in construction funding from all other sources. When comparing percentages of total funding by source in 1969 and 1981 at COTH hospitals, the contribution from internal operations was nearly halved, state and local grants or appropriations diminished by three-fourths, philanthropy fell by more than two-thirds, and federal construction grants became negligible, dropping from 13 percent to considerably less than 1 percent of total funding. These rates of change in percentages of total funding were similar to, though slightly higher than, the rate of change in inflation-adjusted dollar amounts by source. Debt financing, on the other hand, increased nearly four-fold in 1969 constant dollars between 1969 and 1981 and by slightly less on the basis of percentage of total construction funds.

Comparisons with Other Hospitals

As Table 3 depicts, state and local tax-exempt bonds were the leading source of construction funds in 1981 across all categories of COTH and other nonfederal, nonprofit hospitals. However, among state and local government-owned COTH hospitals, state and local grants and appropriations (40.6 percent of total construction funding) provided nearly as much support as state and local tax-exempt bonds (42.1 percent of total construction funding). Among all state and local government hospitals in 1981, the respective figures for these sources of construction funds was 25.7 percent and 39.4 percent of total funding. The proportion of total construction funds from state and local grants and appropriations at the state and local government owned COTH institutions in 1981 was higher than in 1979 (at 22.9 percent) but lower than in 1974 (at 60.8 percent). The debt at these COTH hospitals was largely (95 percent) in the form of state and local tax-exempt bonds. At all state and local government hospitals nationwide, such bond issues provided only 68.2 percent of total construction funds, while 22.7 percent of the debt financing was acquired through direct loans or federal tax-exempt bonds. State and local government COTH hospitals reported no funds from these last two sources.

The figures for construction funding by

TABLE 1

Funding of Construction Projects in COTH Nonfederal Hospitals, 1969, 1974, 1979, 1981*

Funding Sources	In Current Dollars (millions)				In Constant (1969) Dollars (millions)†				Percentage of Total			
	1969 (n = 126)	1974 (n = 83)	1979 (n = 123)	1981 (n = 66)	1969 (n = 126)	1974 (n = 83)	1979 (n = 123)	1981 (n = 66)	1969 (n = 126)	1974 (n = 83)	1979 (n = 123)	1981 (n = 66)
Federal grants	37	28	<1	<1	37	18	<1	<1	13	4	<1	<1
State and local grants and appropriations	69	109	51	55	69	71	21	19	24	17	7	6
Philanthropy	44	118	60	42	44	77	25	15	16	18	8	5
Internal operations	76	72	131	129	76	47	54	45	27	11	17	15
Debt	58	328	522	653	58	214	217	229	20	50	68	74
Total	284	655	764	879	284	427	317	308	100	100	100	100

* Source: American Hospital Association's Survey of the Sources of Funding for Hospital Construction, 1969, 1974, 1979, 1981. For 1969, the data reported relate to total funds for construction projects completed that year. For 1974, 1979, and 1981, the data reflect expected total funds for construction projects started in those years.

† Source: U.S. Department of Commerce Composite Construction Cost Index (base period 1977 = 100): 1969 = 53.4; 1974 = 81.8; 1979 = 128.8; and 1981 = 152.5.

TABLE 2

Average Construction Funding Per COTH Nonfederal Hospital, 1969, 1974, 1979, 1981*

Funding Sources	Average Funding Per Institution in Current Dollars (millions)				Average Funding Per Institution in Constant (1969) Dollars (millions)†			
	1969 (n = 126)	1974 (n = 83)	1979 (n = 123)	1981 (n = 66)	1969 (n = 126)	1974 (n = 83)	1979 (n = 123)	1981 (n = 66)
Federal grants	.29	.34	<.01	<.01	.29	.22	<.01	<.01
State and local grants and appropriations	.55	1.31	.41	.83	.55	.86	.17	.29
Philanthropy	.35	1.42	.49	.64	.35	.93	.20	.23
Internal operations	.60	.87	1.06	1.95	.60	.57	.44	.68
Debt	.46	3.95	4.24	9.89	.46	2.58	1.76	3.47
Total	2.25	7.89	6.21	13.32	2.25	5.14	2.58	4.67

* Source: American Hospital Association's Survey of the Sources of Funding for Hospital Construction, 1969, 1974, 1979, 1981. For 1969, the data reported relate to total funds for construction projects completed that year. For 1974, 1979, and 1981, the data reflect expected total funds for construction projects started in those years.

† Source: U.S. Department of Commerce Composite Construction Cost Index (base period 1977 = 100): 1969 = 53.4; 1974 = 81.8; 1979 = 128.8; and 1981 = 152.5.

TABLE 3

Percentage of Construction Funds for COTH Nonfederal Hospitals and All Nonfederal, Nonprofit Short-Term Hospitals, 1981*

Funding Sources	State and Local Government†		Nongovernment, Nonprofit†		Total Nonfederal, Nonprofit†	
	All Hospitals (n = 124)‡	COTH Hospitals (n = 16)	All Hospitals (n = 333)‡	COTH Hospitals (n = 50)	All Hospitals (n = 457)‡	COTH Hospitals (n = 66)
Government						
Federal grants	0.2	<0.1	<0.1	<0.1	<0.1	<0.1
State and local grants and appropriations	25.7	40.6	0.1	<0.1	3.6	6.3
Philanthropy						
Fund raising	0.6	0	2.7	0.6	2.4	0.5
Other contributions	0.3	0	1.5	3.5	1.3	2.9
Foundation grants	0.7	0	0.6	1.6	0.6	1.3
Total philanthropy	1.6	0	4.8	5.7	4.3	4.7
Internal operations§	14.8	15.2	15.8	14.4	15.7	14.5
Debt						
Direct loans	4.6	0	3.6	3.9	3.8	3.3
Taxable bonds	0	0	3.0	0	2.6	0
Tax-exempt bonds						
State and local	39.4	42.1	65.0	68.7	61.5	64.6
Federal	8.5	0	0.6	0	1.6	0
HUD loan insurance	<0.1	0	0.3	0	0.3	0
Hill-Burton loan guarantee	0	0	0	0	0	0
Other	5.2	2.0	6.7	7.2	6.5	6.5
Total debt	57.7	44.1	79.2	79.8	76.3	74.4
Total percentage	100.0	100.0	100.0	100.0	100.0	100.0

* Source: American Hospital Association's Survey of the Sources of Funding for Hospital Construction, 1981.

† Funding totals for the various categories were: state and local government—$498.8 million for all hospitals and $135.1 million for COTH hospitals; nongovernment, nonprofit—$3,183.7 million for all hospitals and $743.9 million for COTH hospitals; total nonfederal, nonprofit—$3,682.5 million for all hospitals and $879 million for COTH hospitals.

‡ Includes COTH nonfederal hospitals.

§ Accumulated earnings.

source at both COTH and all nongovernment, nonprofit hospitals were similar for 1981. The only minor difference was that approximately 4 percent of total funding at all hospitals was derived from taxable bonds, federal tax-exempt bonds and Department of Housing and Urban Development (HUD) loan insurance. No such construction funds were reported by the COTH nongovernment, nonprofit institutions for 1981. Among all the COTH hospitals surveyed, debt financing provided 74.4 percent of all construction funds in 1981 and involved only state and local tax-exempt bonds, direct loans, and other miscellaneous borrowing. An even higher proportion of total funds (76.3 percent) was attributable to debt among all the nonfederal, nonprofit hospitals in 1981. Among this larger group of institutions, debt funding was also acquired from taxable bonds, federal tax-exempt bonds, and HUD loan insurance.

Although it is not possible to relate the dollars expended to the type of construction undertaken, some generalizations can be made about the average amounts spent in 1981. Among the state and local government owned hospitals, COTH members averaged $8.4 million for construction per institution, while all such hospitals averaged $4.0 million. Among the nongovernment, nonprofit institutions, COTH members averaged $14.9 million compared with $9.6 million for all such hospitals. In the overall nonfederal, nonprofit category, COTH hospitals averaged $13.3 million, while all such hospitals averaged $8.1 million. The higher averages among the COTH institutions may be attributable in large part to their generally larger size. However, bed size data were not available to confirm this.

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